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Instructions for New Jersey Johnson & Ettinger Spreadsheets NJ-GW-SCREEN and NJ-GW-ADV

Introduction

The New Jersey versions of the USEPA Johnson and Ettinger (J&E) Spreadsheets are adapted from the USEPA version 3.1 spreadsheet formulations of the Johnson and Ettinger model (see http://www.epa.gov/oswer/riskassessment/airmodel/johnson_ettinger.htm for complete model documentation and source spreadsheets). The GW-SCREEN and GW-ADV spreadsheets have been adapted for New Jersey use (NJ-GW-SCREEN and NJ-GW-ADV). The following modifications have been made to the USEPA versions of the spreadsheets:

- The VLOOKUP database was changed to contain the current New Jersey contaminant list.
- Chemical properties for the contaminants were updated.
- Toxicity factors for the contaminants were updated.
- Default soil/groundwater temperature is set to 13°C.
- Default depth to groundwater is set to 11.5 feet (352.5 cm).

General Guidelines for Using the New Jersey J&E Spreadsheets

- The only J&E parameters allowed to be adjusted site-specifically are soil texture, depth to groundwater, depth of foundation, building air exchange rate, and the building perimeter.
- A soil/groundwater temperature of 13°C must be used.
- A directly entered value for the soil gas entry rate (Q_{soil}) must be used. The default value of 5 L/min must be used unless a scaled-up version calculated from the site-specific building perimeter is substituted. The use of soil vapor permeabilities to estimate Q_{soil} is not allowed.
- The standard values for soil properties associated with each soil texture that are built into the spreadsheet database must be used. The use of field or laboratory-measured values for soil moisture, soil bulk density and soil porosity is not allowed.
- The decision to use site-specific building parameters (e.g., ventilation rate changes, building size modifications, positive pressure controls) and nonresidential (worker) exposure parameters would necessitate an agreement with the property owner and the implementation of an institutional control at the affected structure/property.
- **For hydrocarbons (benzene, ethyl benzene, toluene, xylene, naphthalene, 2-methylnaphthalene, styrene, 1,3-butadiene, hexane, and cyclohexane), a multiplication factor of ten may be applied to the calculated screening level to allow for contaminant degradation.**
- **Methylene chloride, trichloroethene, and vinyl chloride must have an adjustment factor applied because they are considered mutagens and USEPA applies different calculations to these three chemicals. The factors are: methylene chloride, 0.40; trichloroethene, 0.72; vinyl chloride, 0.29. For these three chemicals, the J&E result is multiplied by the chemical specific factor.**

Site-Specific Adjustments Using the New Jersey J&E Spreadsheets

Using an alternate soil texture (no soil layers) (NJ-GW-SCREEN or NJ-GW-ADV)

- If a soil texture other than sand is to be used, collect soil core(s) and submit samples to laboratory for texture analysis as described in the NJ Vapor Intrusion Technical Guidance (January 2013). At least 75% of the soil vertical profile must be as fine as the selected alternate texture.
- Select the appropriate soil texture in the spreadsheet.
- Select the built-in soil properties for the soil texture.

Using site-specific soil texture layers (NJ-GW-ADV spreadsheet only)

- Layers must be continuous across the site and may not be fractured, as demonstrated by soil borings.
- Enter the depth range of each soil layer in the advanced version of J&E spreadsheet (NJ-GW-ADV). Select the built-in soil properties for each layer.

Modifying the depth to ground water and/or the depth of the foundation (NJ-GW-SCREEN or NJ-GW-ADV)

- Enter the depth of foundation and/or the depth of water table on either the screening (NJ-GW-SCREEN) or advanced (NJ-GW-ADV) spreadsheet. If the depth of the foundation (bottom of the enclosed space floor) is a value other than 15 cm (slab) or 200 cm (basement), the NJ-GW-ADV model must be used.

Adjustment of Building Air Exchange Rate (NJ-GW-ADV spreadsheet only)

- Enter the site-specific air exchange rate (hr^{-1}) in the advanced spreadsheet (NJ-GW-ADV). The air exchange rate of the lowest floor of the building should be used.

Adjustment of Building Perimeter (NJ-GW-ADV spreadsheet only)

- Measure building perimeter in cm. If the height of the lowest floor of the building is greater than 366 cm (12 feet), measure the height of this floor in cm.
- Calculate a site-specific value for the soil gas entry rate Q_{soil} using the following equation: Q_{soil} (L/min)= 5 L/min x Perimeter (cm)/4000 cm
- Enter Qsoil and Perimeter in J&E advanced spreadsheet
- The height of lowest floor of the building may also be entered if it is greater than 366 cm.

Adjusting toxicity factors and exposure assumptions

- Toxicity factors: New IRIS or USEPA Regional Screening Level toxicity factors that have not yet been reflected in the most recent NJDEP vapor intrusion guidance document may be used. The chemical properties database in the spreadsheet must be modified with the new values for the Reference Concentration (RfC) and/or the Unit Risk Factor (URF).

- Use of a worker scenario allows for the following changes in exposure assumptions:
  - The exposure duration may be modified to 25 years. The averaging time for noncarcinogens (used in the J&E spreadsheet) must also be modified to 25 years
  - The exposure frequency may be modified to 250 days/year
  - The J&E result may be multiplied by a factor of three, to adjust the exposure time of the calculated screening level from 24 hours/day to 8 hours/day